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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/791,375	**Applicant(s)** WALCH, MARK A.
	Examiner EDWARD PARK	**Art Unit** 2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26-77* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-77* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is responsive to applicant's amendment and remarks received on 10/8/08. Claims 26-77 are currently pending.

Specification

2. In response to applicant's amendment of the title, the previous title objection is withdrawn.

Claim Rejections - 35 USC § 112

3. In regards to applicant's amendment of claims 51-58, and 27, the previous claim rejections are withdrawn.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 26, 28-30, 32, 33, 34, 41, 42, 43, 49, 50, 51, 56, 57, 58, 59, 60, 67, 68, 69, 75, 76** are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al (US 7,240,062 B2) in view of Syeda-Mahmood (US 5,953,451).

Regarding **claim 26**, Andersen discloses an image recognition system for searching documents in a source language comprising:

an imaged document (see fig. 4, numeral 108, col. 3, lines 7-11; scanned document 108 also referred to herein as a document image), the imaged document being stored in a document database (see fig. 5, numeral 504, 514; memory/storage device); a source language library for storing source language search terms (see fig. 4, numeral 404, fig. 5, numeral 404, col. 5, lines 50-60; dictionary 404 or other word list stored in storage device 514). Andersen does not disclose an image graph constructor coupled to the document database and the source language library, the image graph constructor configured to generate search term image graphs from the source language search terms, and generate a collection of image graphs representing the imaged document; an image graph database for storing the search term image graphs and the collection of image graphs generated by the image graph constructor; and a comparison module coupled to the image graph database, the comparison module configured to search the imaged documents by comparing the collection of image graphs with selected search term image graphs;

wherein if at least one image graph from the collection of image graphs matches the selected search term image graphs, the imaged document is flagged as containing a search term justifying further analysis of the document.

Syeda-Mahmood, in the same field of endeavor, teaches an image graph constructor coupled to the document database and the source language library (see fig. 3, numeral 3; fig. 4, numeral 7; col. 5, lines 1-44; curve group generator), the image graph constructor configured to generate search term image graphs from the source language search terms (see fig. 4, numeral 7; col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions, once the lines of text are determined grouping involves assembling all such word segments that are separated by a distance), and generate a collection of image graphs representing the imaged document (see fig. 3, numeral 3, col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions, once the lines of text are determined grouping involves assembling all such word segments that are separated by a distance); an image graph database for storing the search term image graphs and the collection of image graphs generated by the image graph constructor (see fig. 3, numeral 5, fig. 4, numeral 12, col. 6, lines 10-60; Image Hash Table to represent information in the position of features in curves in curve groups in a manner that helps locate a query handwritten word); and a comparison module coupled to the image graph database, the comparison module configured to search the imaged documents by comparing the collection of image graphs with selected search term image graphs; wherein if at least one image graph from the collection of image graphs matches the selected search term image graphs, the imaged document is flagged as containing a search term justifying further analysis of the document (see fig. 4, numeral 11, see col. 8, lines 1-26; using the pose parameter, all points on curves of the query word are projected into the document image at location where it is then verified if a point feature on each curve in the image

lies within some neighborhood of the projected point, the ratio of matched projected points to the total number of point on all curves in the query word constitutes a verification score, the verification is said to succeed if this score is above a suitably chosen threshold).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize a image graph constructor to compare for a search term as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation", "greater ability to deal with handwriting variation", and "means for organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

Regarding **claim 28**, Andersen discloses an electronic version of a physical source language document (see fig. 1, numeral 104, 106, 108, col. 2, lines 63-67, col. 3, lines 1-11; analog document 104 is scanned by a digital scanner and the output of the digital scanner 106 is a scanned document 108).

Regarding **claim 29**, Andersen discloses generation by scanning the physical source language document (see fig. 1, numeral 104, 106, 108, col. 2, lines 63-67, col. 3, lines 1-11; analog document 104 is scanned by a digital scanner and the output of the digital scanner 106 is a scanned document 108).

Regarding **claim 30**, Andersen discloses a collection of source language characters (see fig. 4, numeral 404; dictionary which represents a language in which words are indexed that consist of characters).

Regarding **claims 32, 33, 34**, Andersen discloses all elements as mentioned above in claim 26. Andersen does not disclose generating an image graph for each character contained in

the source language library and configured to employ an image graph generation process and involving an image reduction process and a data storage process.

Syeda-Mahmood, in the same field of endeavor, teaches generating an image graph for each character contained in the source language library (see col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions) and configured to employ an image graph generation process (see fig. 3, numeral 3, see fig. 4, numeral 8, col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions, once the lines of text are determined grouping involves assembling all such word segments that are separated by a distance) and involving an image reduction process and a data storage process (see col. 6, lines 9-67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize a image graph constructor to generate an image graph and image reduction process as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation", "greater ability to deal with handwriting variation", and "means for organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

Regarding **claims 41, 42**, Andersen discloses all elements as mentioned above in claim 26. Andersen does not disclose transforming into a collection of image graph by the image graph generation process; producing a collection of image graphs.

Syeda-Mahmood, in the same field of endeavor, teaches transforming into a collection of image graph by the image graph generation process (see fig. 4, numeral 3); producing a collection of image graphs (see fig. 3, 5a).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize transformation into image graphs as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation" and “means for organizing documents in a database that enables fast search and retrieval” (see col. 3, lines 29-39).

Regarding **claims 43, 49**, Andersen discloses all elements as mentioned above in claim 26. Andersen does not disclose configuring to execute a screening process and a searching process and employing a depth first search.

Syeda-Mahmood, in the same field of endeavor, teaches configuring to execute a screening process and a searching process (see col. 8, lines 1-26; recovering pose parameters by solving the set of linear equation for the matching basis points corresponding to significant hits and verification is executed and said to succeed if this score is above a suitable chosen threshold) and employing a depth first search (see col. 8, lines 1-26; if no matching basis points are verified, then the next most signification query curve group is tried until no more significant groups are left).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize a screening, searching, and employing a depth first search as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation" and “means for

organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

Regarding **claim 50**, Andersen discloses all elements as mentioned above in claim 43. Andersen does not disclose computing the number of connections between the nodes for each image graph in the collection of image graphs to the number of connection nodes in the search term image graph for at least first and second ones of the search term image graphs and link ratios for the first and second stored search term image graphs.

Syeda-Mahmood, in the same field of endeavor, teaches computing the number of connections between the nodes for each image graph in the collection of image graphs to the number of connection nodes in the search term image graph for at least first and second ones of the search term image graphs and link ratios for the first and second stored search term image graphs (see col. 8, lines 1-26).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize connections between nodes as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation" and "means for organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

Regarding **claim 51**, Andersen discloses a method for identifying search terms in a document written in a source language comprising:

establishing a source language lexicon, the source language lexicon including source language search terms (see fig. 4, numeral 404, fig. 5, numeral 404, col. 5, lines 50-60; dictionary 404 or other word list stored in storage device 514); providing an imaged document in the source

language (see fig. 4, numeral 108, col. 3, lines 7-11; scanned document 108 also referred to herein as a document image). Andersen does not disclose inputting the source language search terms and the imaged document into an image graph constructor, the image graph constructor configured to generate search term image graphs representing the source language search terms and configured to generate a collection of image graphs representing the imaged document; searching the imaged document by comparing the collection of image graphs to inputted search term image graphs; and flagging imaged documents when an image graph from the collection of image graphs matches one of the selected search term image graphs.

Syeda-Mahmood, in the same field of endeavor, teaches inputting the source language search terms and the imaged document into an image graph constructor (see fig. 3, numeral 3; fig. 4, numeral 7; col. 5, lines 1-44; curve group generator), the image graph constructor configured to generate search term image graphs representing the source language search terms (see fig. 4, numeral 7; col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions, once the lines of text are determined grouping involves assembling all such word segments that are separated by a distance) and configured to generate a collection of image graphs representing the imaged document (see fig. 3, numeral 3, col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions, once the lines of text are determined grouping involves assembling all such word segments that are separated by a distance); searching the imaged document by comparing the collection of image graphs to inputted search term image graphs; and flagging imaged documents when an image graph from the collection of image graphs matches one of the selected

search term image graphs (see fig. 4, numeral 11, see col. 8, lines 1-26; using the pose parameter, all points on curves of the query word are projected into the document image at location where it is then verified if a point feature on each curve in the image lies within some neighborhood of the projected point, the ratio of matched projected points to the total number of point on all curves in the query word constitutes a verification score, the verification is said to succeed if this score is above a suitably chosen threshold).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize a image graph constructor to compare for a search term as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation", "greater ability to deal with handwriting variation", and “means for organizing documents in a database that enables fast search and retrieval” (see col. 3, lines 29-39).

Regarding **claim 56**, Andersen discloses an electronic version of a physical source language document (see fig. 1, numeral 104, 106, 108, col. 2, lines 63-67, col. 3, lines 1-11; analog document 104 is scanned by a digital scanner and the output of the digital scanner 106 is a scanned document 108).

Regarding **claim 57**, Andersen discloses generation by scanning the physical source foreign language document (see fig. 1, numeral 104, 106, 108, col. 2, lines 63-67, col. 3, lines 1-11; analog document 104 is scanned by a digital scanner and the output of the digital scanner 106 is a scanned document 108).

Regarding **claims 58, 59, 60**, Andersen discloses all elements as mentioned above in claim 51. Andersen does not disclose generating an image graph for each character contained in

the source language lexicon and configuring to employ an image graph generation process and involving an image reduction process and data storage process.

Syeda-Mahmood, in the same field of endeavor, teaches generating an image graph for each character contained in the source language lexicon library (see col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions) and configuring to employ an image graph generation process (see fig. 3, numeral 3, see fig. 4, numeral 8, col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions, once the lines of text are determined grouping involves assembling all such word segments that are separated by a distance) and involving an image reduction process and data storage process (see col. 6, lines 9-67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize a image graph constructor to generate an image graph and image reduction process as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation", "greater ability to deal with handwriting variation", and "means for organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

Regarding **claims 67, 68, 75, 76,** Andersen discloses all elements as mentioned above in claim 51. Andersen does not disclose transforming into a collection of image graph by the image graph generation process; producing a collection of image graphs; a depth first search; computing the number of connections between the nodes for each image graph in the collection of image graphs to the number of connection nodes in the search term image graph for at least

first and second ones of the search term image graphs and link ratios for the first and second stored search term image graphs.

Syeda-Mahmood, in the same field of endeavor, teaches transforming into a collection of image graph by the image graph generation process (see fig. 4, numeral 3); producing a collection of image graphs (see fig. 3, 5a); a depth first search (see col. 8, lines 1-26; if no matching basis points are verified, then the next most signification query curve group is tried until no more significant groups are left); computing the number of connections between the nodes for each image graph in the collection of image graphs to the number of connection nodes in the search term image graph for at least first and second ones of the search term image graphs and link ratios for the first and second stored search term image graphs (see col. 8, lines 1-26).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize transformation into image graphs, a depth search, and connection between nodes as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation" and "means for organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

Regarding **claim 69**, Andersen discloses all elements as mentioned above in claim 51. Andersen does not disclose configuring to execute a screening process and a searching process.

Syeda-Mahmood, in the same field of endeavor, teaches configuring to execute a screening process and a searching process (see col. 8, lines 1-26; recovering pose parameters by solving the set of linear equation for the matching basis points corresponding to significant hits

and verification is executed and said to succeed if this score is above a suitable chosen threshold).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen reference to utilize a screening and searching as suggested by Syeda-Mahmood, to enable a "fast method of localizing handwritten word patterns in handwritten documents without detail text segmentation" and "means for organizing documents in a database that enables fast search and retrieval" (see col. 3, lines 29-39).

6. **Claims 27, 31, 52, 54** are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al (US 7,240,062 B2) with Syeda-Mahmood (US 5,953,451), and further in view of Loudon et al (US 6,556,712 B1).

Regarding **claim 27**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 26. Andersen with Syeda-Mahmood combination does not disclose any language other than English.

Loudon, in the same field of endeavor, teaches any language other than English (see fig. 7, 8, 9, col. 1, lines 58-67, col. 2, lines 1-18).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize any language other than English as suggested by Loudon, to "improve the accuracy of the HMM techniques used" (see col. 4, lines 1-9) to "achieve better accuracy and speed of recognition of handwritten characters" (see col. 6, lines 1-13) due to the complexity of the ideographies characters and the character distortion due to non-linear shifting and multiple styles of writing (see pg. 1, lines 26-33).

Regarding **claim 31**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 30. Andersen with Syeda-Mahmood combination does not disclose written and typographical variations of each source language character.

Loudon, in the same field of endeavor, teaches written and typographical variations of each source language character (see fig. 5, numeral 210, col. 11, lines 54-67, col. 12, lines 1-42; dictionary or a lexicon of all the characters based on a sequence of the newly defined radical is formed).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize written and typographical variations as suggested by Loudon, to "improve the accuracy of the HMM techniques used" (see col. 4, lines 1-9) to "achieve better accuracy and speed of recognition of handwritten characters" (see col. 6, lines 1-13).

Regarding **claim 52**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 51. Andersen with Syeda-Mahmood combination does not disclose identifying characters associated with the source language; and identifying written and typographical variations for each character.

Loudon, in the same field of endeavor, teaches identifying characters associated with the source language (see col. 6, lines 14-60); and identifying written and typographical variations for each character (see fig. 5, numeral 210, col. 11, lines 54-67, col. 12, lines 1-42; dictionary or a lexicon of all the characters based on a sequence of the newly defined radical is formed).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize written and typographical

variations as suggested by Loudon, to "improve the accuracy of the HMM techniques used" (see col. 4, lines 1-9) to "achieve better accuracy and speed of recognition of handwritten characters" (see col. 6, lines 1-13).

Regarding **claim 54**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 51. Andersen with Syeda-Mahmood combination does not disclose non Roman characters.

Loudon, in the same field of endeavor, teaches non Roman characters (see fig. 7, 8, 9, col. 1, lines 58-67, col. 2, lines 1-18).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize non Roman characters as suggested by Loudon, to "improve the accuracy of the HMM techniques used" (see col. 4, lines 1-9) to "achieve better accuracy and speed of recognition of handwritten characters" (see col. 6, lines 1-13) due to the complexity of the ideographies characters and the character distortion due to non-linear shifting and multiple styles of writing (see pg. 1, lines 26-33).

7. **Claims 35-40, 44-48, 61-66, 70-74, 77** are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al (US 7,240,062 B2) with Syeda-Mahmood (US 5,953,451), and further in view of Krtolica (US 5,719,959).

Regarding **claims 35, 37-40**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 34. Andersen with Syeda-Mahmood combination does not disclose extracting information concerning the character's link and node connections, storing the skeleton image of character as a data structure having a header and a connectivity network, a Connectivity Array and a Connectivity Key, a given node of the character being a series of

integers, each integer being equal to the number of nodes having a given number of connections between nodes, connected to the given node, and a given plurality of nodes and connections between the given plurality of nodes, the unique Connectivity Key corresponding to a Connectivity Array for each node of the character.

Krtolica, in the same field of endeavor, teaches extracting information concerning the character's link and node connections (see fig. 2, numeral 210, 212, col. 6, lines 36-61), storing the skeleton image of character as a data structure having a header and a connectivity network (see col. 2, lines 66-67, col. 3, lines 1-21, col. 6, lines 36-67), a Connectivity Array and a Connectivity Key (see fig. 2, col. 6, lines 36-61), a given node of the character being a series of integers, each integer being equal to the number of nodes having a given number of connections between nodes, connected to the given node (see fig. 6, 7; col. 6, lines 36-47), and a given plurality of nodes and connections between the given plurality of nodes, the unique Connectivity Key corresponding to a Connectivity Array for each node of the character (see fig. 6, 7; col. 6, lines 36-61).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize a Connectivity Array and a Connectivity Key as suggested by Krtolica, to provide an "adequately robust technique for recognizing optical characters or other patterns as corresponding to one of a known set of patterns" (see col. 2, lines 12-14).

Regarding **claim 36**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 33. Andersen with Syeda-Mahmood combination does not disclose

reducing the character to a skeleton image; representing the skeleton image of the character in the form of a linked list comprising a plurality of entries and a plurality of pointers between the entries, organized on the basis of internal structure corresponding to a plurality of nodes, and connections between the plurality of nodes, wherein each of the plurality of entries in the linked list corresponds to one of the plurality of nodes, and each of the pointers between entries corresponds to one of the connections between nodes; and storing the image graph of the character as the representation of the internal structure of the character.

Krtolica, in the same field of endeavor, teaches reducing the character to a skeleton image (see fig. 7); representing the skeleton image of the character in the form of a linked list comprising a plurality of entries and a plurality of pointers between the entries, organized on the basis of internal structure corresponding to a plurality of nodes, and connections between the plurality of nodes, wherein each of the plurality of entries in the linked list corresponds to one of the plurality of nodes, and each of the pointers between entries corresponds to one of the connections between nodes (see fig. 6, fig. 7, col. 6, lines 36-67); and storing the image graph of the character as the representation of the internal structure of the character (see fig. 1, numeral 108, 110, 114).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize a skeleton image and connect nodes to each other as suggested by Krtolica, to provide an "adequately robust technique for recognizing optical characters or other patterns as corresponding to one of a known set of patterns" (see col. 2, lines 12-14).

Regarding **claims 44-48**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 43. Andersen with Syeda-Mahmood combination does not disclose a screen by Connectivity Key method and a screen by Connectivity Array method; the screening by Connectivity Key is conducted to determine the Connectivity Key contained in the header of the imaged graph search term match the Connectivity Key contained in the header of an image graph of the collection of image graphs; if the screening by Connectivity Key is successful, the searching process is activated; comparing the Connectivity Array associated with the search term image graphs with the each Connectivity Array associated with the collection of image graphs; if the screening by Connectivity Array is successful, the searching process is activated.

Krtolica, in the same field of endeavor, teaches a screen by Connectivity Key method and a screen by Connectivity Array method (see fig. 2, numeral 210, 212, 214); the screening by Connectivity Key is conducted to determine the Connectivity Key contained in the header of the imaged graph search term match the Connectivity Key contained in the header of an image graph of the collection of image graphs (see col. 6, lines 36-67); if the screening by Connectivity Key is successful, the searching process is activated (see col. 6, lines 36-67); comparing the Connectivity Array associated with the search term image graphs with the each Connectivity Array associated with the collection of image graphs (see col. 6, lines 36-67); if the screening by Connectivity Array is successful, the searching process is activated (see col. 6, lines 36-67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize Connectivity Key Array method to screen and match as suggested by Krtolica, to provide an "adequately robust technique for

recognizing optical characters or other patterns as corresponding to one of a known set of patterns" (see col. 2, lines 12-14).

Regarding **claims 61-66**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 60. Andersen with Syeda-Mahmood combination does not disclose extracting information concerning the character's link and node connections; reducing the character to a skeleton image; representing the skeleton image of the character in the form of a linked list comprising a plurality of entries and a plurality of pointers between the entries, organized on the basis of internal structure corresponding to a plurality of nodes, and connections between the plurality of nodes, wherein each of the plurality of entries in the linked list corresponds to one of the plurality of nodes, and each of the pointers between entries corresponds to one of the connections between nodes; and storing the image graph of the character as the representation of the internal structure of the character; storing the skeleton image of character as a data structure having a header and a connectivity network, Connectivity Array and a Connectivity Key, a given node of the character being a series of integers, each integer being equal to the number of nodes having a given number of connections between nodes, connected to the given node, and a given plurality of nodes and connections between the given plurality of nodes, the unique Connectivity Key corresponding to a Connectivity Array for each node of the character.

Krtolica, in the same field of endeavor, teaches reducing the character to a skeleton image (see fig. 7); representing the skeleton image of the character in the form of a linked list comprising a plurality of entries and a plurality of pointers between the entries, organized on the basis of internal structure corresponding to a plurality of nodes, and connections between the

plurality of nodes, wherein each of the plurality of entries in the linked list corresponds to one of the plurality of nodes, and each of the pointers between entries corresponds to one of the connections between nodes (see fig. 6, fig. 7, col. 6, lines 36-67); and storing the image graph of the character as the representation of the internal structure of the character (see fig. 1, numeral 108, 110, 114); storing the skeleton image of character as a data structure having a header and a connectivity network (see col. 2, lines 66-67, col. 3, lines 1-21, col. 6, lines 36-67), a Connectivity Array and a Connectivity Key (see fig. 2, col. 6, lines 36-61), a given node of the character being a series of integers, each integer being equal to the number of nodes having a given number of connections between nodes, connected to the given node (see fig. 6, 7; col. 6, lines 36-47), and a given plurality of nodes and connections between the given plurality of nodes, the unique Connectivity Key corresponding to a Connectivity Array for each node of the character (see fig. 6, 7; col. 6, lines 36-61).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize a skeleton image and connect nodes to each other incorporating a Connectivity Array and a Connectivity Key as suggested by Krtolica, to provide an "adequately robust technique for recognizing optical characters or other patterns as corresponding to one of a known set of patterns" (see col. 2, lines 12-14).

Regarding **claims 70-74**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 68. Andersen with Syeda-Mahmood combination does not disclose a screen by Connectivity Key method and a screen by Connectivity Array method; the screening by Connectivity Key is conducted to determine the Connectivity Key contained in the header of the imaged graph search term match the Connectivity Key contained in the header

of an image graph of the collection of image graphs; if the screening by Connectivity Key is successful, the searching process is activated; comparing the Connectivity Array associated with the search term image graphs with the each Connectivity Array associated with the collection of image graphs; if the screening by Connectivity Array is successful, the searching process is activated.

Krtolica, in the same field of endeavor, teaches a screen by Connectivity Key method and a screen by Connectivity Array method (see fig. 2, numeral 210, 212, 214); the screening by Connectivity Key is conducted to determine the Connectivity Key contained in the header of the imaged graph search term match the Connectivity Key contained in the header of an image graph of the collection of image graphs (see col. 6, lines 36-67); if the screening by Connectivity Key is successful, the searching process is activated (see col. 6, lines 36-67); comparing the Connectivity Array associated with the search term image graphs with the each Connectivity Array associated with the collection of image graphs (see col. 6, lines 36-67); if the screening by Connectivity Array is successful, the searching process is activated (see col. 6, lines 36-67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood to utilize Connectivity Key Array method to screen and match as suggested by Krtolica, to provide an "adequately robust technique for recognizing optical characters or other patterns as corresponding to one of a known set of patterns" (see col. 2, lines 12-14).

Regarding **claim 77**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 51. Andersen with Syeda-Mahmood combination as applied in claim 51 does not disclose creating an image of each of the characters contained in the source

language lexicon; reducing the image of the character to a skeleton image; ordering the plurality of nodes in a first order; reordering the plurality of nodes in a second order, wherein the second order is the same of all characters having the same number of nodes connected by the same number of connections between nodes in the same manner as the test character;
representing the skeleton image of the character on the basis of the internal structure of the character by a descriptor corresponding to a plurality of nodes and connections between the plurality of nodes of the character, wherein the descriptor is a Connectivity Key which unique for a given plurality of nodes and connections between the given plurality of nodes, the unique Connectivity Key corresponding to the second order of the plurality of nodes; and storing the Connectivity Key representation of the internal structure of the character as the descriptor of the character.

Syeda-Mahmood, in the same field of endeavor, teaches creating an image of each of the characters contained in the source language lexicon (see col. 5, lines 1-67; generate connected components of dark regions constituting word segments as well as curved from the boundaries of such connected regions).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood as applied in claim 51 to utilize a creation of an image from the language lexicon as suggested by Syeda-Mahmood, to enable a "greater ability to deal with handwriting variation", and “means for organizing documents in a database that enables fast search and retrieval” (see col. 3, lines 29-39).

Krtolica, in the same field of endeavor, teaches reducing the image of the character to a skeleton image (see fig. 7); ordering the plurality of nodes in a first order; reordering the

plurality of nodes in a second order (see fig. 2, numeral 206-209), wherein the second order is the same of all characters having the same number of nodes connected by the same number of connections between nodes in the same manner as the test character (see fig. 2, numeral 209); representing the skeleton image of the character on the basis of the internal structure of the character by a descriptor corresponding to a plurality of nodes and connections between the plurality of nodes of the character, wherein the descriptor is a Connectivity Key which unique for a given plurality of nodes and connections between the given plurality of nodes, the unique Connectivity Key corresponding to the second order of the plurality of nodes (see fig. 2, numeral 210, 212, col. 6, lines 36-67); and storing the Connectivity Key representation of the internal structure of the character as the descriptor of the character (see fig. 1, numeral 108, 110, 114).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood as applied above to utilize Connectivity Key in connection with a plurality of nodes and connections through the reduction of a character to a skeleton image as suggested by Krtolica, to provide an "adequately robust technique for recognizing optical characters or other patterns as corresponding to one of a known set of patterns" (see col. 2, lines 12-14).

8. **Claims 53, 55** are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen et al (US 7,240,062 B2) with Syeda-Mahmood (US 5,953,451), and further in view of Appleby (US 2005/0015240 A1).

Regarding **claims 53, 55**, Andersen with Syeda-Mahmood combination discloses all elements as mentioned above in claim 51. Andersen with Syeda-Mahmood combination does not disclose identifying search terms in a first language; and interpreting the search term from

the fist language to the source language using an interpreter fluent in the source language; supplementing the source language lexicon by identifying, in the source language all colloquial variations of the source language search terms in the source language.

Appleby, in the same field of endeavor, teaches identifying search terms in a first language; and interpreting the search term from the fist language to the source language using an interpreter fluent in the source language; supplementing the source language lexicon by identifying, in the source language all colloquial variations of the source language search terms in the source language (see fig. 3, fig. 21, paragraphs [0051-0054], [0228]-[0232]).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the Andersen with Syeda-Mahmood as applied above to utilize a translator as suggested by Appleby, to align “discontinuous sequence of words” and words that are mutually exclusive are considered together or neighbors in representation (see paragraph [0189]).

Response to Arguments

9. Applicant's arguments filed on 10/8/08, in regards to claims 26 have been fully considered but they are not persuasive. Applicant argues that the Anderson reference does not an imaged document being stored in a document database (see pg. 20, last paragraph - pg. 21, first paragraph). This argument is not considered persuasive since it is disclosed within col. 6, lines 34-40, which has a memory 504 that stores a linking module the links nodes in the scanned document 108. Furthermore, applicant admits in the argument/response section on pg. 21, first paragraph, which "after the imaged document is obtained the document is reduced into image

segments corresponding to individual words while in memory". Essentially, an imaged document can be interpreted as a segmented image since within the claim, it cites an image document. The claim does not cite that the imaged document can not be segmented or split. Therefore, the Anderson reference meets the cited limitation. Applicant argues that Syeda-Mahmood does not disclose an imaged document being stored in a document database and therefore the limitation of claim 26 is not met (see pg. 21, last paragraph). This argument is not considered persuasive since it is the Anderson reference that discloses the cited limitation as seen in the argument and rejection as stated above.

Applicant argues that Syeda-Mahmood does not disclose "a comparison module configured to search ... further analysis of the document" (see pg. 21, last paragraph – pg. 22, first paragraph). This argument is not considered persuasive since Syeda-Mahmood discloses the cited limitation within fig. 4, numeral 11, col. 8, lines 1-26, using the pose parameter, all points on curves of the query word are projected into the document image at location where it is then verified if a point feature on each curve in the image lies within some neighborhood of the projected point, the ratio of matched projected points to the total number of point on all curves in the query word constitutes a verification score, the verification is said to succeed if this score is above a suitably chosen threshold. Examiner notes that a comparison module is disclosed within the cited section and that the applicant is interpreting image graph too narrowly, as the examiner is interpreting image graph as reasonably as possible, and in this case as any algorithm/means that represents the image in any form that is able to be utilized in comparison or verification. Applicant argues that Syeda-Mahmood teaches a user is asked to verify whether the match is valid and therefore can not the Syeda-Mahmood reference can not teach "comparing ... a search

term.." (see pg. 22, last paragraph). This argument is not considered persuasive since the cited limitation is taught within fig. 4, numeral 11, col. 8, lines 1-26 as seen in Syeda-Mahmood, which is mentioned above. Furthermore, applicant further argues that there is no teaching or suggestion of creating graphs which are based on the centerline and not the contour of the connected components, or that the topology of these graphs are encoded in to a unique identifier that represents the topology that serves as the basis for the alignment of physical features (see pg. 23, first paragraph). This argument is not considered persuasive since the limitations are not cited within claim 26 and therefore are irrelevant. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., creating graphs which are based on the centerline and not the contour of the connected components, or that the topology of these graphs are encoded in to a unique identifier that represents the topology that serves as the basis for the alignment of physical features) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding claims 27-30, 32, 33, 34, 41, 42, 43, 49, 50, applicant argues that the claims are allowable for the same reasons as mentioned in respect to claim 26 (see pg. 23, third paragraph). This argument is not considered persuasive since claim 26 stands rejected and the arguments and rejection of the claim can be seen above.

Regarding claim 51, applicant argues that the claim is allowable due to the same reasons as stated above for claim 26 (see pg. 23, fourth paragraph - last paragraph). This argument is not

considered persuasive since claim 26 stands rejected and the arguments and rejection of the claim can be seen above.

Regarding claims 54, 56, 57, 58, 59, 60, 67, 68, 69, 75, 76, applicant argues that the claims are allowable for the same reasons as mentioned in respect to claim 51 (see pg. 24, first paragraph). This argument is not considered persuasive since claim 51 stands rejected and the arguments and rejection of the claim can be seen above.

Regarding claims 31, 52, applicant argues that the claims are allowable for the same reasons as mentioned in regards to claims 26, 51, respectively (see pg. 24, second paragraph, third paragraph). This argument is not considered persuasive since claims 26, 51 stand rejected and the arguments and rejection of the claims can be seen above.

Regarding claims 35-40, 44-48, 61-66, 70-74, 77, applicant argues that the claims are allowable for the same reasons as mentioned in regards to claims 26, 51, respectively (see pg. 24, last paragraph, pg. 25, first paragraph). This argument is not considered persuasive since claims 26, 51 stand rejected and the arguments and rejection of the claims can be seen above.

Regarding claims 53, 55, applicant argues that the claims are allowable for the same reasons as mentioned in regards to claim 51 (see pg. 25, second paragraph – last paragraph). This argument is not considered persuasive since claim 51 stands rejected and the arguments and rejection of the claims can be seen above.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD PARK whose telephone number is (571)270-1576. The examiner can normally be reached on M-F 10:30 - 20:00, (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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